A2500-64 S/P5

paper
paperboard
wood pulp
capacity

1983-1986
with additional data for 1987

fiber consumption

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Paper and paperboard capacity in place during 1984 will average 72.7 million tons, 1,623,000 tons or 2.3% above 1983. For the future years covered in this survey; namely, 1985 through 1987, growth in capacity is expected to moderate to an average of 1.6% a year. The net gain of 3,568,000 tons of capacity obtained from new and improved manufacturing facilities will bring the industry's production potential to 76.3 million tons in 1987.

Capacity to produce wood pulp, which is expected to reach 57.1 million tons this year for an increase of 1.8%, will also grow at a slower rate, averaging 1.4% annually through 1987. Net additions during this three-year period should increase capacity for producing wood pulp by 2,460,000 tons to a level approaching 60 million tons. During these same three years, market pulp capacity is expected to increase by 497,000 tons or 6.6%.

A breakdown of planned increases by major product groups (Table 1) shows that printing and writing paper mills, which now account for 26% of total paper and paperboard capacity, will supply an impressive 61% of all capacity growth in the 1985-1987 period. Above average rates of expansion are also indicated for tissue papers and for solid bleached paperboard; all three categories should experience higher rates of growth than they achieved during the previous ten years.

In contrast to these plans for stronger growth, producers of newsprint and unbleached kraft packaging papers have shut down some facilities and plan further shutdowns which, despite some offsetting increases, will result in a decline in capacity for these products of some 300,000 tons by 1987.

Note: Unless stated otherwise, all references to paper and paperboard and wood pulp exclude construction grades.

TABLE 1:
GROWTH TRENDS IN CAPACITY

Thousands short tons

GRADES	ADDITIONS 1975-1984		ADDITIONS 1985-1987	
	10 YEAR INCREASE	AVERAGE ANNUAL GROWTH	3 YEAR INCREASE	AVERAGE ANNUAL GROWTH
TOTAL ALL GRADES PAPER & PAPERBOARD	**12,013**	**1.7%**	**3,545**	**1.5%**
TOTAL PAPER & PAPERBOARD	13,222	2.0	3,568	1.6
TOTAL PAPER	**8,319**	**2.6**	**2,283**	**2.0**
NEWSPRINT	2,125	1.7	(55)	(0.3)
PRINTING & WRITING	5,642	3.4	2,183	3.6
PACKAGING & IND. CONV.	(369)	(0.6)	(222)	(1.3)
TISSUE	921	2.0	377	2.3
TOTAL PAPERBOARD	**4,903**	**1.5**	**1,285**	**1.2**
UNBLEACHED KRAFT	3,825	2.5	572	1.1
SOLID BLEACHED	266	0.7	252	2.0
SEMICHEMICAL	789	2.2	174	1.1
RECYCLED	22	—	287	1.1
CONSTRUCTION GRADES	**(1,209)**	**(3.4)**	**(23)**	**(0.3)**
TOTAL ALL GRADES WOOD PULP	**9,666**	**1.8%**	**2,407**	**1.4%**
TOTAL WOOD PULP (exciuding pulp for Construction Paper & Board)	**10,002**	**1.9**	**2,460**	**1.4**
DISSOLVING & SPECIAL ALPHA	(320)	(1.9)	—	—
SULPHITE	(675)	(3.2)	(2)	—
SULPHATE & SODA*	8,678	2.3	2,186	1.7
SEMICHEMICAL	336	0.8	85	0.6
MECHANICAL	1,982	4.0	191	1.0
WOOD PULP FOR CONSTRUCTION PAPER & BOARD	**(336)**	**(2.2)**	**(53)**	**(1.4)**

*includes screenings

Not adjusted for rounding differences.

TABLE 2:
COMPARISON OF CAPACITY ESTIMATES FOR TOTAL PAPER & PAPERBOARD

Thousands short tons

SURVEY PUBLISHED IN:	ESTIMATES					
	1982	1983	1984	1985	1986	1987
1979	70,564					
1980	70,406	71,565				
1981	70,355	71,833	72,964			
1982	70,197	71,155	72,455	73,806		
1983	70,086*	70,814	71,965	73,054	74,084	
1984		71,126*	72,749	73,700	74,973	76,317
WIDEST ◗ DEVIATION FROM ACTUAL	0.7%	1.0%				
	WIDEST RANGE ◗		1.4%	1.0%	1.2%	—

*Actual

TABLE 3:
ANNUAL CAPACITIES 1970-1987

Thousands short tons

YEAR	ANNUAL CAPACITY		CAPACITY ADDITIONS DURING YEAR		PERCENT INCREASE	
	PAPER & PAPERBOARD	ALL GRADES	PAPER & PAPERBOARD	ALL GRADES	PAPER & PAPERBOARD	ALL GRADES
1970	53,260	57,195	1,140	1,221	2.2%	2.2%
1971	54,136	58,141	876	946	1.6	1.7
1972	55,873	59,965	1,671	1,824	3.1	3.1
1973	58,164	62,284	2,291	2,319	4.1	3.9
1974	59,527	63,779	1,363	1,495	2.3	2.4
1975	60,140	64,369	613	590	1.0	0.9
1976	61,307	65,673	1,167	1,304	1.9	2.0
1977	62,004	66,459	697	786	1.1	1.2
1978	63,091	67,419	1,087	960	1.8	1.4
1979	64,615	69,033	1,524	1,614	2.4	2.4
1980	66,368	70,716	1,753	1,683	2.7	2.4
1981	68,172	72,255	1,804	1,539	2.7	2.2
1982	70,086	73,118	1,914	863	2.8	1.2
1983	71,126	74,017	1,040	899	1.5	1.2
1984F	72,749	75,626	1,623	1,609	2.3	2.2
1985F	73,700	76,553	951	927	1.3	1.2
1986F	74,973	77,827	1,273	1,274	1.7	1.7
1987F	76,317	79,171	1,344	1,344	1.8	1.7

F—Forecast

Comparison of Survey Estimates

Table 2, which compares capacity estimates made in the last six API surveys, suggests that business climate may affect producers' year-to-year estimates of capacity. It shows, for example, that for 1982 previous capacity surveys had overstated the actual capacity, with the widest deviation being 0.7%. A similar tendency to overstate capacity occurred in the earlier surveys of 1983 capacity. The effects of the 1981-1982 recession and reduced profitability are clearly revealed in the steady erosion of expansion plans made during those years.

The 1983 recovery brought a reverse movement, and this year's survey shows capacity for paper and paperboard in 1984 about 784,000 tons larger than anticipated in the 1983 survey.

Printing and writing papers experience an increase of 921,000 tons of capacity this year compared with the estimates made last year; unbleached kraft paperboard is 119,000 tons higher while shutdowns remove 235,000 tons of recycled paperboard capacity. The total capacity reported for subsequent years is also higher than last year's survey showed. The reasons for some of these changes will be covered in the sections describing each of the major grades.

These adjustments reflect the ability of some producers to modify machine schedules and product allocations to meet changing demand conditions. This flexibility is sometimes referred to as "sponge." We remind readers again that capacity estimates derived from the surveys represent the best efforts of mill managers and planners to estimate the changes in machine capacity that can result from several

TABLE 4:
REGIONAL DISTRIBUTION–CAPACITY & CHANGES

GRADES	NORTHEAST		CENTRAL		SOUTH		WEST	
	SHARE OF U.S. CAPACITY 1983	SHARE OF U.S. CAPACITY CHANGES 1984-1987*	SHARE OF U.S. CAPACITY 1983	SHARE OF U.S. CAPACITY CHANGES 1984-1987*	SHARE OF U.S. CAPACITY 1983	SHARE OF U.S. CAPACITY CHANGES 1984-1987*	SHARE OF U.S. CAPACITY 1983	SHARE OF U.S. CAPACITY CHANGES 1984-1987*
PAPER & PAPERBOARD								
TOTAL†	**16.7%**	**10.8%**	**18.5%**	**17.1%**	**52.0%**	**63.3%**	**12.8%**	**8.8%**
PRINTING & WRITING	32.7	12.2	29.9	20.9	29.5	58.0	7.9	8.9
TISSUE	30.4	28.6	25.8	15.0	27.1	57.1	16.7	(0.7)
UNBL. KRAFT PAPERBOARD	—	—	—	—	83.7	88.7	16.3	11.3
SEMICHEMICAL PAPERBOARD	2.0	0.4	32.6	27.5	50.8	58.1	14.6	14.0
WOOD PULP								
TOTAL†	**7.7%**	**1.4%**	**6.5%**	**15.1%**	**70.2%**	**75.4%**	**15.6%**	**8.1%**
SULFATE & SODA	5.7	1.2	3.3	13.9	76.1	76.1	14.9	8.8
SEMICHEMICAL	10.9	1.4	30.8	20.1	45.1	79.7	13.2	(1.2)
MECHANICAL	19.9	2.5	11.1	21.5	46.5	69.3	22.5	6.7

**Percent change in four year period*
†Total of grades shown

TABLE 5:
FIBER SOURCES FOR PAPER & PAPERBOARD MANUFACTURE

Thousands short tons

GRADES	1983		1984	1985	1986	1987	
	ANNUAL TONS	PERCENT	ANNUAL TONS	ANNUAL TONS	ANNUAL TONS	ANNUAL TONS	PERCENT
TOTAL CONSUMPTION	**68,087**	**100.0%**	**72,358**	**74,062**	**76,102**	**77,154**	**100.0%**
PRIMARY FIBERS	**30,582**	**44.9**	**32,616**	**33,421**	**34,378**	**34,933**	**45.3**
WOOD PULP	30,582	44.9	32,616	33,421	34,378	34,933	45.3
SECONDARY FIBERS	**37,505**	**55.1**	**39,742**	**40,641**	**41,724**	**42,221**	**54.7**
WOOD PULP	21,252	31.2	22,387	22,561	22,823	23,094	29.9
RECYCLABLE PAPER*	15,822	23.2	16,912	17,607	18,410	18,634	24.2
OTHER	431	0.7	443	473	491	493	0.6

Note: Consumption for 1985–1987 assumes capacity levels of production.
**Includes the following tonnage consumed in the manufacture of molded pulp products: 1983, 174,000 tons; 1984, 184,000 tons; 1985-1987, 192,000 tons.*

sources, including changes in demand. Volatile demand conditions can alter these estimates in any given year, although over the long run the changes tend to balance out.

The survey also indicates that there will be no major changes in the number of operating days. Yet current labor contracts provide more flexibility in this matter than earlier negotiations permitted. The overall effect of working rule changes on the industry's capacity can only be ascertained after demand and production conditions make their effect apparent.

Regional Capacity

The sixteen states whch constitute the Southern census region of the country produce 52% of all U.S. paper and paperboard and 70% of all wood pulp. As reported in this survey, planned expansions in this region will further increase its share of capacity; about 63% of all capacity growth in paper and paperboard and 75% of wood pulp expansions in the four years 1984-1987 will take place in the Southern region.

The Northeast, Central and Western regions will all lose share of paper and paperboard capacity during this four-year period and only the Central region, with a large greenfield market pulp mill slated for completion in 1987, will expand its capacity base for wood pulp.

New Survey Feature

In response to requests for additional information on the age and geographical distribution of facilities in place in the pulp and paper industry, we have included a series of tables on pages 20 through 23 that show the data by regions and by major grades. The tables include previously unavailable statistics on the age and geographical

distribution of paper machines and on the integration to wood pulp in paper and paperboard mills. Tracing the median values of the age of paper machines by product group shows a tendency in all groups for machines to cluster around the 10-year period; that is, half of the capacity was installed prior to 1975 and half after that. Tissue and packaging and industrial paper machines have a somewhat older median age while semichemical paperboard machines are of slightly more recent vintage. Thus, despite significant changes in the trends of growth in each grade of paper and paperboard over the years, there has been a fairly steady pattern of updating and improving the capacity that is retained.

Raw Materials

Fueled by increases in paper and paperboard production, the consumption of wood pulp, recyclable paper and other paper-making raw materials will increase from 68.1 million tons in 1983 to a record 72.4 million tons in 1984. This substantial 6.3% increase follows a strong 8% increase in consumption in 1983 as the paper industry recovered from the 1982 recession.

Recovered products will continue to be the major source of furnish, accounting for almost 55% of the total. During the 1984-1987 years, wood pulp produced from manufacturing and forest residues is expected to decline from 31.2% to 29.9% of total fiber consumed while share for recyclable paper is expected to grow from 23.2% in 1983 to 24.2% in 1987.

PAPER AND PAPERBOARD

Newsprint

In recent years U.S. newsprint capacity has grown at a rapid pace. However, for the four-year period 1984 through 1987, respondents to our survey report no major expansions either from the installation of new paper machines or from the conversion of existing machines to newsprint production from other product grades. In addition, one existing machine was shut down this year and two more will be idled in 1985 and the capacities of these machines totalling more than 300,000 tons, have been removed from the estimates made in the 1983 survey.

As a result of this combination of circumstances, newsprint capacity is expected to decline in the three years ahead; our estimates show a 55,000 ton reduction in annual capacity by 1987. The most recent Canadian Pulp and Paper Association survey, released in April 1984, projects no growth in Canadian newsprint capacity between 1983 and 1986.

Printing and Writing

Generally favorable market conditions in the past have encouraged producers of printing and writing papers to increase capacity by almost 5 million tons or about 36% in the ten-year period ending in 1983. Very strong growth in demand and production in 1983 and 1984 resulted in upward adjustments of reported capacity for these years. The survey shows 19.8 million tons of printing and writing paper capacity in 1984, 921,000 tons above the level estimated in last year's survey. Much of the upward revision was in uncoated free sheet papers, with estimates for 1984 now 529,000 tons higher than anticipated last year. In coated papers, both groundwood and free sheet, 1984 capacity is reported 320,000 tons higher than in last year's survey.

Analysis of these increases shows that machine rebuilds and speed-ups, restarts of idle machines, and accelerated start-ups or improved performance on new paper machines account for much of the gain. A considerable, although smaller, increase was also achieved from changes which resulted in higher productivity of machines. Such increases in capacity were also evident in the similarly strong markets that prevailed in 1973; they demonstrate the flexibility with which the industry is able to respond to near-term increases in changing demands for its products.

Planned capacity additions to printing and writing papers over the next three years, including the start-up of at least seven new paper machines, will add an additional 2,183,000 tons of capacity and yield a growth rate averaging 3.6% per year. If all of these new facilities are carried through to completion, capacity in printing and writing papers will reach almost 22 million tons in 1987 and comprise 29% of all paper and paperboard.

Tissue

Capacity expansions for tissue papers, including sanitary and industrial grades, will average 2.3% in the 1985-1987 years, to reach 5.6 million tons in 1987. This rate of growth exceeds the average annual rate of increase of 2.0% per year from 1974 through 1984 and confirms the more aggressive plans of tissue paper producers that were reported in last year's survey.

Packaging Papers

Over a ten-year period, capacity for unbleached kraft packaging papers has declined by 435,000 tons to a level slightly below the 1974 capacity of 4.4 million tons. For the most part, these losses have reflected increased competition from alternative packaging materials, which has accelerated the closure of marginal or unprofitable facilities and has contributed to the modification of some paper machines to produce other grades. Loss of capacity will continue, according to the survey, and the shutdown of three paper machines in 1984 and 1985 will contribute to a further 6% decline—or 250,000 annual tons—by 1987.

Unbleached Kraft Linerboard and Semichemical Paperboard

With only one new kraft linerboard machine and no new semichemical paperboard machines committed to come into production after 1984, growth in capacity for these containerboard grades will average only slightly more than 1% annually over the next three years.

While these growth rates fall considerably below historical levels, any assessment of the manufacturing potential for containerboard must take into account that some kraft paper machines can be converted to produce kraft linerboard. In addition, a number of expansion projects have been under active study for some time and, since much preliminary work has already been completed, could probably be brought into production fairly rapidly.

Solid Bleached Paperboard

After a ten-year period of low growth in which increased capacity for bleached paperboard averaged only 0.7% annually, new expansions, as presently planned, should yield a 6% increase totalling 252,000 tons between 1985 and 1987. Projects scheduled for completion during this period include a new paperboard machine, some plant modernization and the shutdown of some existing capacity.

Recycled Paperboard

The recycled paperboard segment of the industry has been undergoing major structural changes. Over time, excess capacity, erratic markets and the availability of substitute products have contributed to a prolonged period in which no significant growth in capacity has been possible. One indication of these operating difficulties has been the permanent shutdown, between 1970 and 1984, of more than 100 machines with capacities totalling more than 3 million tons. Despite these closures, which comprised almost 30% of all paper and paperboard facilities shut down during this period, recyclers have added to capacity sufficiently to maintain a 12% to 15% share of total industry capacity.

A more positive growth picture is foreseen in the 1985-1987 period with new expansions, including the start-up of a major new paperboard machine, expected to provide a 287,000 ton capacity increase.

WOOD PULP

Dissolving Pulps

The producers of dissolving and special alpha pulps report that capacity will remain unchanged at 1.5 million tons through 1987. Virtually all of these high cellulose pulps are marketed for end uses outside the paper industry.

Sulfite Pulps

Sulfite pulp capacity has declined steadily in recent years both in absolute tons and in share of total chemical paper grade pulps. This reduced capacity, which is partly due to the high cost of bringing mills into compliance with stringent government pollution control standards, continues into 1984 with the shutdown of two mills with capacities totalling approximately 100,000 tons. Although no capacity changes are reported for the remaining three years in this survey, it is possible that additional mill closings may occur during this period.

Sulfate and Soda Pulps

A greenfield pulp mill and other major expansion projects are expected to increase capacity for sulfate and soda pulps by 2,186,000 tons or 5.1% in the three years 1985-1987. All of the planned expansions will be in bleached and semibleached pulps which will expand capacity by a full 10% and boost their share of all sulfate pulps from 51.1% in 1984 to 53.6% in 1987. Unbleached pulps, however, are not only expected to lose share during these years but also to experience a slight overall decline in capacity. Factors contributing to this loss will include changes in end use, which will require the conversion of existing facilities from unbleached to bleached pulps, and the absence of major kraft linerboard expansions, which would require comparable expansion in unbleached pulp.

Mechanical Pulps

Thermomechanical pulps were first produced in U.S. mills in 1975 and are now widely used as furnish for newsprint and groundwood printing papers. While the nine-year period of exceptionally strong growth, in which capacity increased at a rate averaging almost 40% yearly, appears to have ended in 1984, capacity will nonetheless increase by 194,000 tons over the next three years and account for all of the new growth in mechanical pulps.

Pulps for Market Sale

Pulp-drying machines allocated to the production of sulfate market pulp will expand market pulp capacity from an annual level of 5.7 million tons in 1984 to 6.2 million tons in 1987. This 2.8% average annual growth rate is significantly higher than the 1.7% average rate for sulfate pulps as a whole and continues a ten-year period of sustained growth in which market pulp supply has increased by more than 60%.

Norma Pace

Norma Pace
Senior Vice President
November, 1984

paper & paperboard
capacity summary annual

Practical Maximum Basis Thousands short tons

GRADES	1983	1984	1985	1986	1987*
TOTAL ALL GRADES	**74,017**	**75,626**	**76,553**	**77,827**	**79,171**
Total Paper & Paperboard	**71,126**	**72,749**	**73,700**	**74,973**	**76,317**
Total Paper	**35,675**	**36,851**	**37,297**	**38,100**	**39,134**
NEWSPRINT	5,774	5,847	5,758	5,765	5,792
PRINTING WRITING & RELATED	18,633	19,770	20,462	21,087	21,953
Uncoated Groundwood	1,710	1,693	1,710	1,712	1,713
Coated Groundwood	3,522	3,701	3,744	3,863	4,262
Coated Free Sheet	2,473	2,704	2,849	2,959	3,069
Uncoated Free Sheet	9,354	10,083	10,559	10,915	11,266
Cotton Fiber	162	176	180	180	181
Thin Papers	347	338	338	338	338
Solid Bleached Bristols	1,065	1,075	1,082	1,119	1,126
PACKAGING & IND. CONV.	6,078	5,991	5,755	5,754	5,769
Unbleached Kraft	4,065	3,954	3,704	3,700	3,705
Bleached Packaging & Ind. Conv.	569	566	571	556	556
Specialty Packaging	550	551	554	563	565
Special Industrial	894	919	926	934	942
TISSUE	5,190	5,243	5,322	5,494	5,620
Total Paperboard	**35,451**	**35,898**	**36,403**	**36,874**	**37,183**
UNBLEACHED KRAFT	17,511	17,790	18,027	18,214	18,362
of which Kraft Linerboard	16,217	16,488	16,723	16,914	17,052
SOLID BLEACHED	4,129	4,187	4,321	4,354	4,439
SEMICHEMICAL	5,119	5,219	5,299	5,350	5,393
RECYCLED	8,692	8,702	8,756	8,956	8,989
Total Construction Paper & Board and Other	**2,891**	**2,877**	**2,853**	**2,854**	**2,854**

**Capacity additions presented here for 1987 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.*

Totals not adjusted for rounding differences.

capacity reductions

MILLS AND MACHINES SHUT DOWN

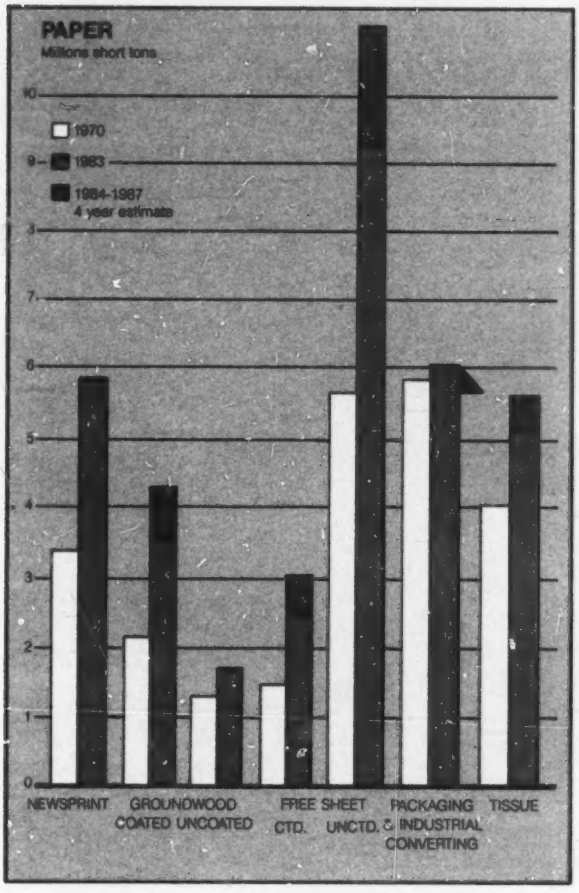
1970-1975

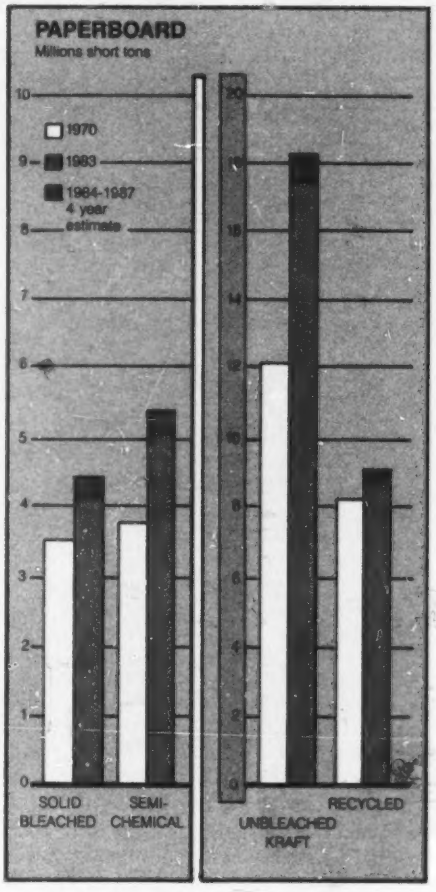
Grades	Number of Machines	Number of Complete Mills	Annual Capacity
TOTAL	**183**	**56**	**3,514**
Paper & Paperboard			
Newsprint	—	—	—
Printing-Writing	68	13	1,062
Pkg. & Ind. Conv.	24	6	222
Tissue	24	8	250
Unbleached Kraft	2	—	128
Solid Bleached	2	—	61
Semichemical	6	2	248
Recycled	49	23	1,362
Construction Paper & Board	8	4	181

1976-1979

Grades	Number of Machines	Number of Complete Mills	Annual Capacity
TOTAL	**105**	**27**	**2,606**
Paper & Paperboard			
Newsprint	3	1	231
Printing-Writing	27	3	468
Pkg. & Ind. Conv.	24	4	357
Tissue	16	5	154
Unbleached Kraft	1	1	240
Solid Bleached	2	1	162
Semichemical	2	—	145
Recycled	19	5	630
Construction Paper & Board	11	7	219

capacity/annual growth comparison





PAPER AND PAPERBOARD

Thousands short tons

1980-1982			
		Annual Capacity	
Number of Machines	Number of Complete Mills	Removed from Survey	Not Removed from Survey
188	87	5,015	225
—			
1	—	26	—
27	5	517	134
22	8	341	—
29	12	264	91
6	—	792	—
—	—	—	—
7	2	449	—
25	12	967	—
71	48	1,659	—

Thousands short tons

1983-1987			
		Annual Capacity	
Number of Machines	Number of Complete Mills	Removed from Survey	Not Removed from Survey
39	15	1,392	371
—			
3	—	305	—
5	—	58	14
5	—	372	—
8	4	101	—
1	—	225	—
1	—	83	—
1	—	47	—
8	7	119	197
7	4	82	160

Shutdowns represent machines and mills reported to the API as permanent or indefinite closures and have been removed from capacity totals. Not all of the facilities have been dismantled and some portion of their productive capacity could be restored.

wood pulp

capacity summary annual

Practical Maximum Basis
Thousands short tons

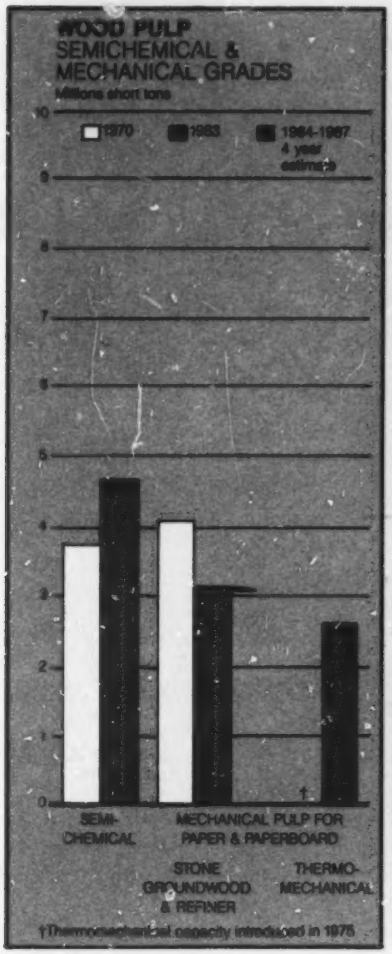
GRADES	1983	1984	1985	1986	1987*
TOTAL ALL GRADES WOOD PULP	**57,590**	**58,461**	**59,069**	**60,237**	**60,868**
Total Wood Pulp (exc. pulp for Construction Paper & Board)	**56,143**	**57,139**	**57,800**	**58,968**	**59,599**
DISSOLVING	1,525	1,504	1,504	1,504	1,504
CHEMICAL PAPER GRADES	44,284	44,980	45,650	46,721	47,165
SULFITE PAPER GRADES	1,788	1,726	1,718	1,722	1,724
SULFATE & SODA PAPER GRADES	42,495	43,255	43,932	44,999	45,441
Bleached & Semibleached Softwood	12,111	12,429	12,954	13,339	13,518
Bleached & Semibleached Hardwood	9,179	9,663	10,105	10,671	10,823
Unbleached	21,206	21,163	20,873	20,989	21,100
SEMICHEMICAL	4,490	4,569	4,609	4,624	4,654
MECHANICAL	5,814	6,054	6,005	6,088	6,245
SCREENINGS	31	31	31	31	31
Total Wood Pulp for Construction Paper & Board†	**1,447**	**1,322**	**1,269**	**1,269**	**1,269**
TOTAL MACHINE DRIED WOOD PULP	**9,647**	**9,833**	**10,283**	**10,539**	**10,485**
DISSOLVING	1,525	1,504	1,504	1,504	1,504
CHEMICAL PAPER GRADES	8,014	8,220	8,670	8,926	8,872
SULFITE	475	489	491	491	491
SULFATE	7,539	7,731	8,179	8,435	8,381
Bleached & Semibleached	7,380	7,569	8,017	8,225	8,167
Unbleached	159	162	162	210	214
ALL OTHER	108	110	110	110	110

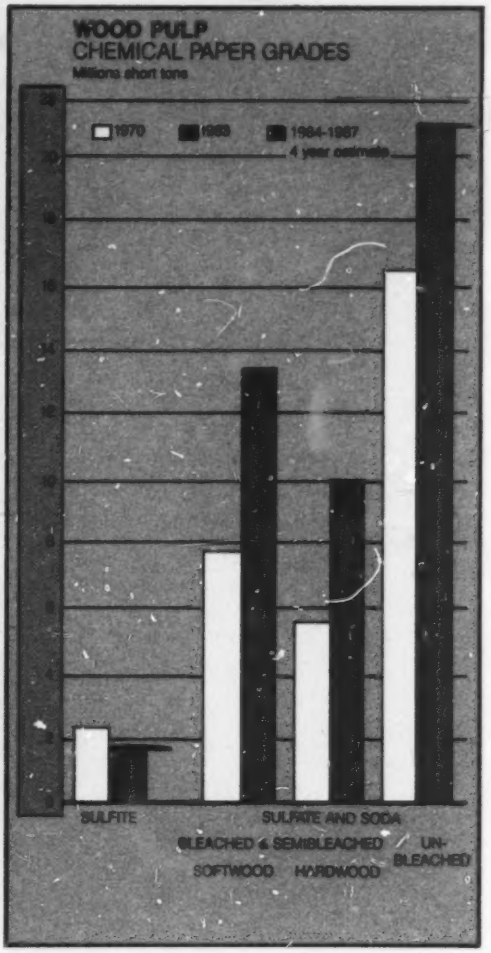
**Capacity additions presented here for 1987 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.*

†Excludes the defibrated/exploded pulp capacity of mills that produce hard pressed board.

Totals not adjusted for rounding differences.

capacity/annual growth comparison





Practical Maximum Basis
Thousands short tons

GRADES	1983	1984	1985	1986	1987*
TOTAL MARKET WOOD PULP	**7,414**	**7,569**	**7,994**	**8,172**	**8,066**
DISSOLVING	1,519	1,504	1,504	1,504	1,504
CHEMICAL PAPER GRADES	5,881	6,051	6,477	6,654	6,548
SULFITE	352	359	359	359	359
SULFATE	5,529	5,692	6,118	6,295	6,189
Bleached & Semibleached	5,372	5,532	5,958	6,088	5,977
Unbleached	157	160	160	208	212
ALL OTHER	14	14	14	14	14

Based on information provided by producers. Reflects diversion of drying capacity to and from own use, installation of new equipment and retirement of existing equipment.

**Capacity additions presented here for 1987 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.*

Totals not adjusted for rounding differences.

paper by grade

capacity/annual • year end • daily

	ALL GRADES PAPER & PAPER-BOARD Total	PAPER & PAPER-BOARD Total		Practical Maximum Basis Thousands short tons	PAPER Total	NEWS-PRINT Total	Total	Uncoated Ground-wood
ANNUAL CAPACITY 1983-1987	74,017	71,126	1983	Annual Capacity	35,675	5,774	18,633	1,710
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective	589	589		New Machines	510	161	315	—
	1,020	1,035		Net Improvements	666	(88)	822	(18)
	75,626	72,749	1984	**Annual Capacity**	**36,851**	**5,847**	**19,770**	**1,693**
	407	405		New Machines	368	25	264	—
	520	546		Net Improvements	78	(114)	429	17
	76,553	73,700	1985	**Annual Capacity**	**37,297**	**5,758**	**20,462**	**1,710**
	984	984		New Machines	428	—	297	—
	290	291		Net Improvements	375	8	328	2
	77,827	74,973	1986	**Annual Capacity**	**38,100**	**5,765**	**21,087**	**1,712**
	1,035	1,065		New Machines	838	—	750	—
	279	279		Net Improvements	197	26	115	1
	79,171	76,317	1987*	**Annual Capacity**	**39,134**	**5,792**	**21,953**	**1,713**
YEAR END CAPACITY 1983-1987	74,913	72,009	1983	**Year End Capacity**	**36,413**	**5,963**	**19,216**	**1,653**
Year End Capacity is calculated by multiplying Daily Rate by number of Available Days	501	569		New Machines	507	41	359	—
	873	927		Net Improvements	375	(161)	566	57
	76,346	73,494	1984	**Year End Capacity**	**37,295**	**5,844**	**20,142**	**1,710**
	386	388		New Machines	213	—	199	—
	385	384		Net Improvements	72	(94)	432	—
	77,119	74,236	1985	**Year End Capacity**	**37,580**	**5,750**	**20,773**	**1,710**
	1,276	1,279		New Machines	654	—	443	—
	88	87		Net Improvements	305	21	176	3
	78,483	75,929	1986	**Year End Capacity**	**38,540**	**5,771**	**21,392**	**1,713**
	762	762		New Machines	762	—	762	—
	268	268		Net Improvements	140	25	95	—
	79,513	76,959	1987*	**Year End Capacity**	**39,441**	**5,796**	**22,248**	**1,713**
DAILY RATE 1983-1987	351	352	1983	Available Days	353	357	353	357
	213.44	204.82		**Daily Rate**	**103.11**	**16.72**	**54.38**	**4.63**
	351	352	1984	Available Days	354	357	354	358
	217.29	208.63		**Daily Rate**	**105.48**	**16.38**	**56.84**	**4.78**
	351	352	1985	Available Days	354	357	354	358
	219.49	210.83		**Daily Rate**	**106.26**	**16.10**	**58.63**	**4.78**
	351	352	1986	Available Days	354	357	354	358
	223.54	214.68		**Daily Rate**	**108.99**	**16.16**	**60.39**	**4.79**
	351	352	1987*	Available Days	354	357	354	358
	225.58	217.67		**Daily Rate**	**111.53**	**16.24**	**62.80**	**4.79**

*Capacity additions presented here for 1987 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

PRINTING, WRITING & RELATED						PACKAGING & INDUSTRIAL CONVERTING					TISSUE
Coated Groundwood	Coated Free Sheet	Uncoated Free Sheet	Cotton Fiber	Thin Papers	Solid Bleached Bristols	Total	Unbleached Kraft	Bleached Packaging & Industrial Converting	Specialty Packaging	Special Industrial	Total
3,522	2,473	9,354	162	347	1,065	6,078	4,065	569	550	894	5,190
35	88	191	—	—	—	—	—	—	—	—	35
144	143	537	14	(8)	10	(87)	(111)	(3)	1	25	18
3,701	**2,704**	**10,083**	**176**	**338**	**1,075**	**5,991**	**3,954**	**566**	**551**	**919**	**5,243**
9	20	235	—	—	—	—	—	—	—	—	79
34	125	242	4	—	7	(236)	(251)	5	3	7	—
3,744	**2,849**	**10,559**	**180**	**338**	**1,082**	**5,755**	**3,704**	**571**	**554**	**926**	**5,322**
75	82	119	—	—	22	—	—	—	—	—	131
45	29	237	—	—	15	(1)	(3)	(15)	9	8	41
3,853	**2,959**	**10,915**	**180**	**338**	**1,119**	**5,754**	**3,700**	**556**	**563**	**934**	**5,494**
351	93	298	—	—	8	—	—	—	—	—	87
48	16	53	1	—	(2)	15	5	—	3	8	39
4,262	**3,069**	**11,266**	**181**	**338**	**1,126**	**5,769**	**3,705**	**556**	**565**	**942**	**5,620**
3,582	**2,605**	**9,792**	**170**	**341**	**1,073**	**6,011**	**3,990**	**560**	**548**	**913**	**5,223**
34	75	250	—	—	—	—	—	—	—	—	107
107	133	260	9	(3)	3	(3)	(42)	26	4	8	(28)
3,723	**2,813**	**10,302**	**180**	**338**	**1,076**	**6,009**	**3,949**	**586**	**553**	**921**	**5,301**
—	2	199	—	—	—	—	—	—	—	—	14
32	51	327	—	—	20	(287)	(267)	(30)	3	7	20
3,755	**2,865**	**10,828**	**180**	**338**	**1,097**	**5,722**	**3,682**	**556**	**555**	**929**	**5,335**
160	175	78	—	—	30	—	—	—	—	—	211
57	25	90	—	—	1	42	23	—	9	10	67
3,972	**3,065**	**10,996**	**180**	**338**	**1,127**	**5,764**	**3,705**	**556**	**565**	**938**	**5,613**
299	—	462	—	—	—	—	—	—	—	—	—
37	8	50	1	—	(2)	12	3	—	2	7	8
4,309	**3,073**	**11,508**	**181**	**338**	**1,125**	**5,775**	**3,708**	**556**	**566**	**945**	**5,621**
355	355	353	314	339	356	349	354	351	350	326	353
10.08	**7.34**	**27.77**	**.54**	**1.01**	**3.01**	**17.23**	**11.26**	**1.60**	**1.56**	**2.80**	**14.78**
358	356	353	316	339	356	349	354	350	351	327	353
10.41	**7.90**	**29.16**	**.57**	**1.00**	**3.02**	**17.24**	**11.17**	**1.68**	**1.57**	**2.82**	**15.02**
358	356	353	316	339	356	348	354	350	351	327	353
10.50	**8.05**	**30.66**	**.57**	**1.00**	**3.08**	**16.42**	**10.41**	**1.59**	**1.58**	**2.84**	**15.12**
357	356	353	316	339	356	348	354	350	351	327	353
11.12	**8.62**	**31.13**	**.57**	**1.00**	**3.17**	**16.54**	**10.47**	**1.59**	**1.61**	**2.87**	**15.90**
357	356	353	316	339	356	348	354	350	351	327	353
12.07	**8.64**	**32.57**	**.57**	**1.00**	**3.16**	**16.57**	**10.48**	**1.59**	**1.61**	**2.89**	**15.92**

Totals not adjusted for rounding differences.

paperboard by grade
capacity/annual • year end • daily

		Practical Maximum Basis Thousands short tons	PAPER BOARD Total	UNBLEACHED KRAFT PAPERBOARD Total	Linerboard	Folding	Other	SOLID BLEACHED PACKAGING PAPERBOARD Total	Linerboard	Folding	Milk Carton & Food Service	Other	SEMI-CHEMICAL PAPERBOARD Total	RECYCLED PAPERBOARD Total	Linerboard	Corrugating Medium	Container Chip & Filler Board	Folding	Set-up	Gypsum Wall Board Facing	Other
ANNUAL CAPACITY 1983-1987	1983	Annual Capacity	35,451	17,511	16,217	800	493	4,129	111	1,992	1,812	215	5,119	8,692	395	1,427	247	2,671	324	1,217	2,412
		New Machines	78	14	14	—	—	—	—	—	—	—	64	—	—	—	—	—	—	—	—
		Net Improvements	369	265	257	7	2	58	(7)	30	42	(8)	36	9	—	55	5	(42)	(6)	15	(17)
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective	1984	Annual Capacity	35,898	17,790	16,488	807	495	4,187	104	2,022	1,854	207	5,219	8,702	394	1,482	252	2,629	318	1,232	2,394
		New Machines	30	21	21	—	—	—	—	—	—	—	4	12	12	—	—	—	—	—	—
		Net Improvements	466	216	214	—	2	134	—	25	110	—	75	42	17	10	—	3	—	16	(5)
	1985	Annual Capacity	36,403	18,027	16,723	807	497	4,321	104	2,047	1,964	207	5,299	8,756	424	1,493	252	2,632	318	1,248	2,389
		New Machines	556	207	170	—	37	186	—	136	50	—	—	162	162	—	—	—	—	—	—
		Net Improvements	(85)	(20)	21	—	(41)	(154)	—	(102)	(53)	1	51	38	—	12	—	17	—	1	7
	1986	Annual Capacity	36,874	18,214	16,914	807	493	4,354	104	2,081	1,961	208	5,350	8,956	587	1,504	252	2,650	318	1,249	2,396
		New Machines	228	75	62	—	14	152	—	119	33	—	—	—	—	—	—	—	—	—	—
		Net Improvements	82	72	76	—	(4)	(67)	—	(47)	(21)	—	44	33	—	9	—	12	1	5	7
	1987*	Annual Capacity	37,183	18,362	17,052	807	503	4,439	104	2,153	1,974	208	5,393	8,989	587	1,513	252	2,661	319	1,255	2,403
YEAR END CAPACITY 1983-1987	1983	Year End Capacity	35,596	17,594	16,293	807	493	4,097	104	1,999	1,788	207	5,112	8,793	392	1,479	251	2,681	319	1,218	2,455
		New Machines	51	34	34	—	—	—	—	—	—	—	17	—	—	—	—	—	—	—	—
		Net Improvements	552	322	318	—	4	149	—	33	116	—	158	(77)	19	13	1	(61)	(1)	27	(76)
Year End Capacity is calculated by multipying Daily Rate by number of Available Days	1984	Year End Capacity	36,199	17,950	16,645	807	497	4,247	104	2,032	1,904	207	5,287	8,716	412	1,489	252	2,619	318	1,248	2,380
		New Machines	175	—	—	—	—	—	—	—	—	—	—	175	175	—	—	—	—	—	—
		Net Improvements	312	163	163	—	—	82	—	17	66	—	21	46	—	7	—	25	—	2	12
	1985	Year End Capacity	36,686	18,112	16,808	807	497	4,329	104	2,049	1,970	207	5,307	8,937	587	1,496	252	2,644	319	1,248	2,391
		New Machines	621	283	232	—	51	339	—	255	84	—	—	—	—	—	—	—	—	—	—
		Net Improvements	(218)	(72)	(26)	—	(45)	(242)	—	(157)	(86)	1	60	36	—	12	—	9	—	6	8
	1986	Year End Capacity	37,089	18,324	17,014	807	503	4,426	104	2,147	1,967	208	5,367	8,972	587	1,508	252	2,653	319	1,255	2,400
		New Machines	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		Net Improvements	128	60	60	—	—	14	—	6	8	—	31	22	—	6	—	11	1	—	5
	1987*	Year End Capacity	37,217	18,384	17,074	807	503	4,440	104	2,153	1,975	208	5,398	8,995	587	1,514	252	2,664	319	1,255	2,405
DAILY RATE 1983-1987	1983	Available Days	351	354	354	351	355	356	338	356	356	355	354	340	351	345	338	338	331	339	339
		Daily Rate	101.52	49.67	45.98	2.30	1.39	11.52	.31	5.62	5.02	.58	14.44	25.88	1.12	4.28	.74	7.92	.97	3.60	7.25
	1984	Available Days	351	354	354	351	355	356	338	356	357	356	354	340	351	345	338	338	331	339	339
		Daily Rate	103.17	50.68	46.98	2.30	1.40	11.92	.31	5.70	5.33	.58	14.92	25.64	1.17	4.32	.74	7.74	.96	3.68	7.03
	1985	Available Days	351	354	354	351	355	356	338	356	357	356	354	340	350	345	338	338	331	339	339
		Daily Rate	104.55	51.14	47.44	2.30	1.40	12.15	.31	5.75	5.51	.58	14.98	26.28	1.67	4.34	.74	7.81	.96	3.68	7.06
	1986	Available Days	351	354	354	351	355	356	338	357	357	356	354	340	350	345	338	338	331	339	339
		Daily Rate	105.68	51.73	48.02	2.30	1.42	12.42	.31	6.02	5.51	.58	15.15	26.38	1.67	4.37	.74	7.84	.96	3.70	7.08
	1987*	Available Days	351	354	354	351	355	356	338	357	357	356	354	340	350	345	338	338	330	339	339
		Daily Rate	106.06	51.90	48.19	2.30	1.42	12.46	.31	6.04	5.53	.58	15.24	26.44	1.67	4.39	.74	7.87	.97	3.70	7.10

*Capacity additions presented here for 1987 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

construction paper & board by grade
capacity/annual year end • daily

		CONSTRUCTION PAPER & BOARD & WET MACHINE BOARD Total	Construction Paper	Wet Machine Board	Insulating Board
ANNUAL CAPACITY 1983-1987	1983	2,891	1,234	173	1,484
		1	—	1	—
		(15)	10	4	(29)
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective	1984	2,877	1,244	178	1,455
		2	—	2	—
		(26)	(23)	—	(2)
	1985	2,853	1,221	179	1,453
		—	—	—	—
		1	1	—	—
	1986	2,854	1,222	179	1,453
		—	—	—	—
		—	—	—	—
	1987*	2,854	1,222	179	1,453
YEAR END CAPACITY 1983-1987	1983	2,904	1,248	177	1,478
		2	—	2	—
		(54)	(29)	—	(26)
Year End Capacity is calculated by multipying Daily Rate by number of Available Days	1984	2,852	1,220	179	1,453
		—	—	—	—
		1	1	—	—
	1985	2,853	1,221	179	1,453
		—	—	—	—
		1	1	—	—
	1986	2,854	1,222	179	1,453
		—	—	—	—
		—	—	—	—
	1987*	2,854	1,222	179	1,453
DAILY RATE 1983-1987	1983	329	340	314	323
		8.01	3.67	.56	4.58
	1984	330	341	313	322
		8.66	3.58	.57	4.50
	1985	330	341	313	322
		8.66	3.58	.57	4.50
	1986	330	341	313	322
		8.66	3.58	.57	4.50
	1987*	330	341	313	322
		8.66	3.58	.57	4.50

Totals not adjusted for rounding differences.

wood pulp by grade

capacity/annual • year end • daily

for paper & paperboard

for construction paper & board

| | | Practical Maximum Basis | ALL GRADES WOOD PULP | WOOD PULP (excl. pulp for Construction Paper & Board) | DISSOLVING | CHEMICAL PAPER GRADES | | |

annual capacity/regional distribution

paper & paperboard

TOTAL U.S. CAPACITY		GRADES	NEW ENGLAND		MID-ATLANTIC	
1983	1987	*Practical Maximum Basis/Thousands short tons*	1983	1987	1983	1987
74,017	79,171	TOTAL ALL GRADES PAPER & PAPERBOARD	5,891	6,259	5,929	6,099
71,126	76,317	**TOTAL PAPER & PAPERBOARD**	**5,815**	**6,194**	**5,372**	**5,514**
35,675	**39,134**	**TOTAL PAPER**	**4,997**	**5,365**	**3,842**	**4,063**
5,774	5,792	NEWSPRINT	N.A.	N.A.	N.A.	N.A.
18,633	21,953	PRINTING, WRITING & RELATED	3,736	4,041	2,351	2,451
1,710	1,713	Uncoated Groundwood	733	786	235	164
3,522	4,262	Coated Groundwood	1,280	1,324	264	264
2,473	3,069	Coated Free Sheet	295	404	137	185
9,863	11,785	Uncoated Free Sheet[1]	1,406	1,520	1,699	1,819
1,065	1,126	Solid Bleached Bristols	23	8	16	18
6,078	5,769	PACKAGING & INDUSTRIAL CONVERTING	436	462	236	245
5,190	5,620	TISSUE	533	544	1,048	1,160
35,451	**37,183**	**TOTAL PAPERBOARD**	**818**	**830**	**1,531**	**1,451**
17,511	18,362	UNBLEACHED KRAFT	—	—	—	—
16,217	17,062	of which Kraft Linerboard	—	—	—	—
4,129	4,439	SOLID BLEACHED	N.A.	N.A.	—	—
5,119	5,393	SEMICHEMICAL	N.A.	N.A.	—	—
8,692	8,989	RECYCLED	688	699	1,531	1,451
2,891	**2,854**	**TOTAL CONSTRUCTION PAPER & BOARD**	**66**	**65**	**557**	**585**

wood pulp

57,590	60,868	TOTAL ALL GRADES WOOD PULP	3,298	3,335	1,473	1,472
56,143	**59,599**	**TOTAL WOOD PULP (exc. pulp for Construction Paper & Board)**	**3,218**	**3,253**	**1,353**	**1,370**
1,525	1,504	DISSOLVING	—	—	—	—
1,788	1,724	SULFITE PAPER GRADES	N.A.	N.A.	N.A.	N.A.
42,526	45,472	SULFATE & SODA PAPER GRADES	1,921	1,953	490	494
12,111	13,518	Bleached & Semibleached Softwood	737	720	159	159
9,179	10,823	Bleached & Semibleached Hardwood	1,153	1,204	331	336
21,237	21,131	Unbleached[2]	N.A.	N.A.	—	—
4,490	4,854	SEMICHEMICAL	N.A.	N.A.	418	426
5,814	6,245	MECHANICAL	971	981	189	189
1,447	**1,269**	**WOOD PULP FOR CONSTRUCTION PAPER & BOARD[3]**	**80**	**82**	**120**	**102**

(1) Includes cotton fiber and thin papers.
(2) Includes screenings.
(3) Excludes defibrated/exploded pulp capacity at mills that produce hard pressed board.

E. NO. CENTRAL		W. NO. CENTRAL		SO. ATLANTIC		E. SO. CENTRAL		W. SO. CENTRAL		MOUNTAIN & PACIFIC*	
1983	**1987**	**1983**	**1987**	**1983**	**1987**	**1983**	**1987**	**1983**	**1987**	**1983**	**1987**
11,864	**12,476**	**1,835**	**1,953**	**17,717**	**18,929**	**9,635**	**10,371**	**10,719**	**11,782**	**10,637**	**11,302**
11,355	**12,167**	**1,422**	**1,550**	**17,116**	**18,408**	**9,264**	**9,969**	**10,338**	**11,405**	**10,445**	**11,111**
6,902	**7,601**	**954**	**1,054**	**5,441**	**6,276**	**3,938**	**4,329**	**4,549**	**5,092**	**5,053**	**5,354**
N.A.	N.A.	—	—	818	1,017	1,130	1,071	1,335	1,158	1,853	1,881
4,622	5,217	940	1,038	2,199	2,791	1,764	2,363	1,540	2,276	1,480	1,776
265	285	N.A.	N.A.	N.A.	N.A.	152	148	N.A.	N.A.	156	167
1,045	1,308	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	90	91
864	1,012	N.A.	N.A.	N.A.	N.A.	348	336	N.A.	N.A.	115	121
2,337	2,495	249	257	1,271	1,602	1,058	1,626	789	1,138	1,053	1,327
112	117	—	—	367	415	N.A.	N.A.	401	421	66	70
801	841	N.A.	N.A.	2,019	1,994	486	251	1,231	1,125	855	835
1,339	1,403	—	—	406	473	558	645	442	533	865	861
4,453	**4,566**	**467**	**496**	**11,674**	**12,131**	**5,326**	**5,640**	**5,789**	**6,313**	**5,391**	**5,757**
—	—	—	—	7,713	8,042	3,371	3,566	3,568	3,799	2,859	2,955
—	—	—	—	7,281	7,603	2,968	3,154	3,154	3,387	2,814	2,907
N.A.	N.A.	—	—	1,696	1,804	729	755	1,239	1,413	434	437
1,607	1,684	N.A.	N.A.	1,130	1,085	854	942	615	732	748	786
2,844	2,880	403	433	1,136	1,201	372	377	367	370	1,352	1,578
309	**309**	**413**	**403**	**601**	**521**	**371**	**402**	**381**	**377**	**192**	**191**

3,465	**3,956**	**850**	**893**	**18,164**	**19,129**	**10,212**	**11,271**	**10,359**	**10,817**	**9,768**	**9,995**
3,343	**3,830**	**582**	**620**	**17,732**	**18,873**	**10,001**	**11,039**	**10,229**	**10,704**	**9,685**	**9,909**
—	—	—	—	620	598	N.A.	N.A.	—	—	649	646
485	476	—	—	N.A.	N.A.	—	—	—	—	793	734
1,121	1,518	293	305	15,640	16,600	8,114	9,065	8,601	8,932	6,346	6,605
323	370	N.A.	N.A.	3,695	4,345	2,038	2,436	2,389	2,557	2,685	2,847
570	920	N.A.	N.A.	2,737	3,034	2,401	3,061	1,659	1,932	131	128
N.A.	N.A.	N.A.	N.A.	9,208	9,221	3,674	3,568	4,553	4,444	3,531	3,631
1,338	1,372	N.A.	N.A.	847	839	722	774	458	544	590	588
398	465	245	271	625	834	911	941	1,169	1,228	1,307	1,336
122	**126**	**268**	**273**	**432**	**256**	**211**	**232**	**130**	**113**	**83**	**86**

N.A —Not available.

Totals not adjusted for rounding differences.

*Includes Alaska

world capacity

wood pulp (Except Defibrated/Exploded & Screenings)

Thousands of METRIC tons

	TOTALS		Percent Increase	MECHANICAL		SEMICHEMICAL		CHEMICAL PAPER GRADES		
										of which
				1983	1987	1983	1987	1983	1987	1983
WORLD TOTAL	149,513	160,433	7.3	35,066	38,154	9,561	10,069	98,857	105,956	31,480
DEVELOPED MARKET ECONOMIES			6.8	29,889	32,405	7,761	7,914	80,253	85,769	25,965
NORTH AMERICA			5.6	14,793	15,839	4,535	4,696	52,898	55,769	14,710
of which: U.S.			6.2	5,274	5,665	4,073	4,222	40,203	42,816	7,270
Canada			4.4	9,519	10,174	462	474	12,695	12,953	7,440
JAPAN			1.2	2,546	2,546	1,478	1,336	7,982	8,276	1,058
WESTERN EUROPE			9.2	11,168	12,567	1,182	1,307	18,168	19,614	9,476
of which: E.E.C.			11.9	2,992	3,423	389	439	2,405	2,636	1,150
Nordic countries			8.4	7,162	8,040	675	750	12,035	12,865	6,410
Rest of Western Europe			9.2	1,014	1,104	118	118	3,728	4,113	1,916
OCEANIA			8.6	1,028	1,078	401	410	897	1,037	681
OTHERS			66.8	354	375	165	165	308	1,073	40
DEVELOPING MARKET ECONOMIES			23.0	1,422	1,865	584	830	6,409	7,618	2,858
AFRICA			12.6	78	48	26	41	620	726	497
LATIN AMERICA			20.4	705	1,006	389	455	4,706	5,515	2,190
of which: Brazil			5.5	332	509	150	150	3,009	3,481	1,548
Mexico			22.7	79	199	—	—	541	562	—
ASIA			33.8	639	811	169	334	1,083	1,377	171
CENTRALLY PLANNED ECONOMIES			3.5	3,755	3,884	1,216	1,325	12,195	12,569	2,657
of which: USSR			3.6	2,445	2,500	800	850	8,400	8,700	2,000

Totals not adjusted for rounding differences.

**No data available for 1987.*

industry structure

integration to wood pulp in U.S. paper & paperboard mills

DEGREE OF INTEGRATION TO WOOD PULP	NEW ENGLAND		MID-ATLANTIC		E. NO. CENTRAL		W. NO. CENTRAL	
	NUMBER OF MILLS	SHARE OF PAPER AND PAPERBOARD CAPACITY	NUMBER OF MILLS	SHARE OF PAPER AND PAPERBOARD CAPACITY	NUMBER OF MILLS	SHARE OF PAPER AND PAPERBOARD CAPACITY	NUMBER OF MILLS	SHARE OF PAPER AND PAPERBOARD CAPACITY
TOTAL REGION	89	100%	106	100%	134	100%	18	100%
100% or more	7	17	2	5	1	1	2	6
80% to 99%	3	11	1	1	4	9	1	12
60% to 79%	3	17	3	4	10	14	6	27
40% to 59%	2	10	9	24	12	16	1	17
20% to 39%	1	1	2	2	5	6	1	7
01% to 19%	—	—	—	—	—	—	—	—
Not integrated	73	44	89	64	102	54	7	31

All data based on machines in place January 1983

paper & paperboard (Except Insulating & Hard Pressed Board)

Thousands of METRIC tons

market 1986*	DISSOLVING 1983	DISSOLVING 1987	TOTALS 1983	TOTALS 1987	Percent Increase	NEWSPRINT 1983	NEWSPRINT 1987	PRINTING & WRITING 1983	PRINTING & WRITING 1987	WRAPPING 1983	WRAPPING 1987	ALL OTHERS 1983	ALL OTHERS 1987
33,454	6,030	6,253	206,214	224,634	8.9	30,796	33,229	51,678	58,852	104,127	111,534	19,613	21,019
27,560	3,591	3,657	161,656	175,189	8.4	26,275	27,659	42,482	48,549	78,599	83,746	14,302	15,226
15,796	1,584	1,641	81,500	86,810	6.5	15,208	15,225	18,415	21,816	43,593	45,383	4,284	4,386
8,098	1,383	1,364	65,902	70,508	7.1	5,238	5,255	16,589	19,609	40,468	42,071	3,507	3,571
7,698	201	277	15,696	16,304	3.9	9,970	9,970	1,826	2,207	3,125	3,312	777	815
1,058	449	449	23,106	24,502	6.1	2,837	2,959	5,357	6,180	10,529	11,377	3,875	4,086
9,712	1,118	1,067	52,770	58,836	11.5	7,154	8,324	17,505	19,903	22,327	24,236	5,784	6,376
1,220	252	261	27,466	31,116	13.3	1,782	2,519	10,020	11,580	12,071	13,022	3,593	3,994
6,595	580	520	16,465	18,520	12.5	4,585	4,955	4,795	5,500	5,860	6,695	1,225	1,370
1,897	286	286	8,839	9,204	4.1	787	850	2,690	2,823	4,396	4,519	966	1,012
809	—	—	2,509	2,654	5.8	685	705	278	293	1,332	1,430	214	226
185	440	500	1,681	2,279	35.3	391	446	327	357	818	1,320	145	152
3,237	252	347	18,783	22,429	19.4	1,753	2,654	4,419	5,139	10,569	12,262	2,042	2,374
498	—	—	924	1,118	20.7	15	28	243	303	608	721	58	63
2,489	57	77	10,240	12,508	22.2	820	1,286	2,118	2,591	5,801	6,864	1,501	1,768
1,704	42	62	3,951	4,846	22.7	127	360	943	1,130	2,324	2,754	557	605
—	—	—	2,527	3,415	35.1	201	391	489	595	1,500	1,920	337	509
250	195	270	7,619	8,903	15.6	918	1,340	2,058	2,245	4,160	4,677	483	543
2,657	2,187	2,249	25,773	27,021	4.9	2,768	2,916	4,777	5,164	14,959	15,526	3,269	3,419
2,000	1,625	1,700	13,500	14,000	3.7	1,900	1,950	1,650	1,700	9,080	9,465	870	885

Source: Food and Agriculture Organization of the United Nations, U.S. capacity-American Paper Institute.

The degree of integration to wood pulp for each mill was calculated by dividing on-site wood pulp capacity by paper & paperboard capacity.

DEGREE OF INTEGRATION TO WOOD PULP	SO. ATLANTIC NUMBER OF MILLS	SO. ATLANTIC SHARE OF PAPER AND PAPERBOARD CAPACITY	E. SO. CENTRAL NUMBER OF MILLS	E. SO. CENTRAL SHARE OF PAPER AND PAPERBOARD CAPACITY	W. SO. CENTRAL NUMBER OF MILLS	W. SO. CENTRAL SHARE OF PAPER AND PAPERBOARD CAPACITY	MOUNTAIN & PACIFIC NUMBER OF MILLS	MOUNTAIN & PACIFIC SHARE OF PAPER AND PAPERBOARD CAPACITY	DEGREE OF INTEGRATION TO WOOD PULP
TOTAL REGION	76	100%	43	100%	45	100%	70	100%	TOTAL REGION
100% or more	18	41	16	61	19	63	14	41	100% or more
80% to 99%	16	35	4	21	5	17	7	23	80% to 99%
60% to 79%	4	7	3	7	2	9	4	10	60% to 79%
40% to 59%	2	1	3	3	1	2	1	1	40% to 59%
20% to 39%	4	6	—	—	2	1	1	2	20% to 39%
01% to 19%	—	—	—	—	1	1	1	1	01% to 19%
Not integrated	32	10	17	8	15	7	42	22	Not integrated

industry structure paper & paperboard machines

year of installation or last major rebuild

distribution by region

YEAR MACHINE INSTALLED OR REBUILT	NEW ENGLAND		MID-ATLANTIC		E. NO. CENTRAL		W. NO. CENTRAL	
	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY
Total	245		231		330		38	
No Data Available	74		75		55		5	
Total Sample	171	100.0%	156	100.0%	275	100.0%	33	100.0%
1982	15	5.9	10	4.5	18	9.3	4	14.9
1981	2	3.0	5	5.2	17	7.1	1	2.6
1980	9	7.4	5	4.0	10	5.2	2	3.9
1979	4	1.8	5	3.4	7	5.1	—	—
1978	3	2.7	4	1.1	6	4.6	1	2.2
1977	9	7.9	2	0.5	9	3.5	—	—
1976	7	5.6	4	2.0	11	2.3	1	3.1
1971-1975	22	18.0	33	25.9	43	18.8	7	26.5
1966-1970	34	21.0	34	23.8	58	21.8	5	13.8
1961-1965	25	10.0	26	15.9	28	6.8	8	19.2
1956-1960	7	2.1	12	6.2	19	3.8	1	3.6
1951-1955	10	8.4	1	1.5	15	3.3	2	6.1
Prior to 1950	24	6.2	15	6.0	34	8.4	1	4.1

All data based on machines in place January 1983

distribution by product grade

paper

YEAR MACHINE INSTALLED OR REBUILT	NEWSPRINT		PRINTING & WRITING		PKG. & IND. CONVERTING		TISSUE		UNBLEACH
	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY	NUMBER OF MACHINES
Total	47		437		199		226		72
No Data Available	3		93		26		63		—
Total Sample	44	100.0%	344	100.0%	173	100.0%	163	100.0%	72
1982	1	2.3	30	10.1	13	10.9	5	3.2	6
1981	4	11.7	15	6.2	7	9.9	6	4.6	6
1980	1	3.4	16	7.9	6	1.5	5	4.2	6
1979	6	17.4	11	2.8	—	—	4	4.7	3
1978	—	—	9	2.4	2	0.5	6	5.1	4
1977	—	—	16	5.2	5	5.7	5	4.1	3
1976	1	2.7	16	4.0	4	2.9	10	4.2	1
1971-1975	7	16.3	46	16.0	26	16.2	22	12.4	10
1966-1970	9	21.8	73	22.2	39	23.6	35	25.9	10
1961-1965	2	1.3	53	14.0	22	6.4	37	22.2	9
1956-1960	5	11.4	23	4.5	9	1.8	9	3.5	6
1951-1955	5	9.8	13	2.0	11	8.5	2	1.0	3
Prior to 1950	3	1.9	23	2.7	29	12.1	17	4.9	5

All data based on machines in place January 1983

In the tables below, the total capacity of machines which produce more than one grade of paper or paperboard is included under the grade representing the major portion of their production.

distribution by region

YEAR MACHINE INSTALLED OR REBUILT	SO. ATLANTIC		E. SO. CENTRAL		W. SO. CENTRAL		MOUNTAIN & PACIFIC		YEAR MACHINE INSTALLED OR REBUILT
	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY	
Total	164		83		102		157		Total
No Data Available	37		14		12		24		No Data Available
Total Sample	127	100.0%	69	100.0%	90	100.0%	133	100.0%	Total Sample
1982	8	6.8	4	10.7	4	5.6	6	7.8	1982
1981	11	10.4	3	2.9	5	9.9	7	6.5	1981
1980	2	0.8	5	10.3	1	1.7	6	9.1	1980
1979	9	9.1	2	3.2	3	3.4	3	3.1	1979
1978	8	8.4	1	0.7	3	3.2	4	2.5	1978
1977	4	2.6	1	4.3	6	6.3	7	5.5	1977
1976	4	3.8	3	2.1	4	1.8	5	3.6	1976
1971-1975	24	17.0	14	18.2	16	20.5	17	17.7	1971-1975
1966-1970	20	15.0	11	24.2	21	26.9	23	16.2	1966-1970
1961-1965	12	8.0	9	8.8	11	10.5	26	15.6	1961-1965
1956-1960	10	6.7	7	8.6	6	5.3	8	4.2	1956-1960
1951-1955	8	6.1	2	2.9	4	2.3	7	4.8	1951-1955
Prior to 1950	7	5.3	7	3.1	6	2.6	14	3.4	Prior to 1950

paperboard

construction grades

ED KRAFT	SOLID BLEACHED		SEMICHEMICAL		RECYCLED		CONSTRUCTION		
PERCENT OF TOTAL CAPACITY	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY	NUMBER OF MACHINES	PERCENT OF TOTAL CAPACITY	YEAR MACHINE INSTALLED OR REBUILT
	30		43		195		101		Total
	—		—		47		64		No Data Available
100.0%	30	100.0%	43	100.0%	148	100.0%	37	100.0%	Total Sample
8.5	3	8.1	3	6.8	7	5.2	1	6.1	1982
9.5	—	—	2	6.8	11	7.6	—	—	1981
6.7	—	—	1	1.7	5	3.5	—	—	1980
3.5	3	12.0	1	2.2	5	5.3	—	—	1979
6.9	1	3.5	5	14.5	2	0.6	1	0.3	1978
2.9	2	6.4	—	—	6	6.4	1	3.5	1977
1.5	2	6.6	—	—	2	1.5	3	3.2	1976
16.1	5	19.3	14	37.1	32	24.6	14	51.4	1971-1975
17.8	3	17.5	10	19.6	23	14.9	4	6.1	1966-1970
11.1	3	10.9	4	7.4	10	4.9	5	9.8	1961-1965
6.9	4	9.5	2	3.0	9	5.4	3	7.4	1956-1960
4.5	2	5.0	1	0.9	12	6.3	—	—	1951-1955
4.1	2	1.2	—	—	24	13.8	5	12.2	Prior to 1950

fiber sources

for paper/paperboard/wood pulp manufacture

fiber consumption in paper & paperboard manufacture

Thousands short tons

	Total U.S.	Percent of Total Fiber	New England	Mid-Atlantic	East-North Central	West-North Central	South Atlantic	East-South Central	West-South Central	Mountain & Pacific
1983										
TOTAL FIBER	68,087	100.0	5,088	5,086	10,336	1,509	16,584	9,259	10,282	9,945
TOTAL WOOD PULP	51,834	76.1	3,866	2,798	5,690	955	13,850	8,186	8,976	7,513
Manufactured on-site	43,372	63.7	2,134	1,215	2,692	676	13,368	7,855	8,746	6,686
*Purchased & transferred	8,462	12.4	1,732	1,583	2,998	279	481	331	231	828
†TOTAL RECYCLABLE PAPER	15,822	23.2	1,110	2,244	4,609	534	2,649	1,040	1,245	2,390
Mixed Papers	1,908	2.8	129	422	508	107	364	152	95	130
Newspapers	2,692	4.0	117	611	675	55	408	62	142	621
Corrugated	7,443	10.9	290	635	2,108	302	1,474	647	660	1,327
Pulp Substitutes	2,456	3.6	400	345	650	49	401	162	187	263
High Grade Deinking	1,323	1.9	175	232	667	22	2	17	160	48
OTHER FIBERS	431	0.7	111	43	37	20	86	33	61	41
1984										
TOTAL FIBER	72,358	100.0	5,517	5,175	11,080	1,584	17,832	9,880	10,670	10,620
TOTAL WOOD PULP	55,002	76.0	4,185	2,817	6,031	1,017	14,937	8,746	9,252	8,017
Manufactured on-site	45,996	63.6	2,284	1,193	2,839	731	14,408	8,369	9,058	7,115
*Purchased & transferred	9,006	12.4	1,901	1,023	3,192	286	529	378	194	902
†TOTAL RECYCLABLE PAPER	16,912	23.4	1,213	2,316	5,010	547	2,819	1,097	1,357	2,554
Mixed Papers	2,053	2.8	132	421	570	111	378	163	138	142
Newspapers	2,868	4.0	130	647	722	56	425	64	124	699
Corrugated	7,973	11.9	323	637	2,258	309	1,589	708	741	1,408
Pulp Substitutes	2,535	3.5	421	352	703	50	418	138	188	264
High Grade Deinking	1,483	2.1	207	259	756	22	9	23	166	41
OTHER FIBERS	443	0.6	118	42	40	20	76	37	61	49
1985										
TOTAL FIBER	74,062	100.0	5,701	5,313	11,383	1,636	18,162	10,094	10,866	10,907
TOTAL WOOD PULP	55,981	75.6	4,295	2,780	6,109	1,054	15,257	8,945	9,393	8,148
Manufactured on-site	46,910	63.3	2,401	1,184	2,867	763	14,724	8,559	9,161	7,251
*Purchased & transferred	9,072	12.3	1,894	1,595	3,243	291	533	386	232	897
†TOTAL RECYCLABLE PAPER	17,607	23.8	1,266	2,491	5,231	562	2,829	1,112	1,411	2,705
Mixed Papers	2,127	2.9	139	448	579	112	386	168	140	155
Newspapers	3,021	4.1	143	666	760	58	424	65	126	779
Corrugated	8,369	11.3	334	759	2,338	319	1,678	716	773	1,452
Pulp Substitutes	2,515	3.4	443	367	732	52	321	139	188	272
High Grade Deinking	1,576	2.1	208	251	821	22	19	24	184	47
OTHER FIBERS	473	0.6	139	43	43	20	76	37	61	54
1986										
TOTAL FIBER	76,102	100.0	5,875	5,513	11,616	1,657	18,550	10,308	11,362	11,220
TOTAL WOOD PULP	57,201	75.2	4,422	2,873	6,222	1,061	15,533	9,080	9,765	8,245
Manufactured on-site	47,870	62.9	2,482	1,190	2,959	767	14,936	8,684	9,533	7,319
*Purchased & transferred	9,331	12.3	1,940	1,683	3,262	294	597	396	232	926
†TOTAL RECYCLABLE PAPER	18,410	24.2	1,307	2,593	5,351	576	2,938	1,191	1,533	2,921
Mixed Papers	2,204	2.9	145	463	593	114	401	177	152	158
Newspapers	3,113	4.1	155	685	773	61	436	71	150	782
Corrugated	8,831	11.6	342	800	2,384	326	1,743	765	816	1,655
Pulp Substitutes	2,627	3.5	454	384	764	53	338	151	202	280
High Grade Deinking	1,635	2.1	211	261	836	22	19	27	214	48
OTHER FIBERS	491	0.6	146	46	44	20	79	37	64	55

Comprises all dried, wet lap or slush pulp not produced on-site including transfers from company owned or affiliated mills.
†Includes construction grades and molded pulp products.

FIBER CONSUMPTION IN PAPER AND PAPERBOARD MANUFACTURE (Continued)

Thousands short tons

	Total U.S.	Percent of Total Fiber	New England	Mid-Atlantic	East-North Central	West-North Central	South Atlantic	East-South Central	West-South Central	Mountain & Pacific
1987										
TOTAL FIBER	77,154	100.0	5,914	5,580	11,829	1,667	18,808	10,472	11,611	11,273
TOTAL WOOD PULP	58,028	75.2	4,438	2,892	6,380	1,065	15,777	9,220	9,961	8,295
Manufactured on-site	48,549	62.9	2,491	1,191	3,050	769	15,126	8,824	9,735	7,363
*Purchased & transferred	9,479	12.3	1,947	1,701	3,330	296	651	396	226	932
†TOTAL RECYCLABLE PAPER	18,634	24.2	1,329	2,642	5,406	582	2,952	1,214	1,586	2,923
Mixed Papers	2,215	2.9	149	463	595	114	404	178	153	158
Newspapers	3,127	4.0	161	685	775	61	437	72	154	783
Corrugated	8,930	11.6	352	799	2,399	332	1,757	785	851	1,655
Pulp Substitutes	2,700	3.5	456	419	797	54	334	152	205	282
High Grade Deinking	1,662	2.2	211	277	839	22	19	27	222	44
OTHER FIBERS	493	0.6	147	46	44	20	79	37	64	55

Totals not adjusted for rounding differences.

pulpwood consumption in wood pulp manufacture

Thousands of CORDS

1983										
TOTAL PULPWOOD	81,399	100.0	4,929	2,171	4,804	1,087	25,139	14,541	14,132	14,596
Roundwood & Roundwood Chips	47,988	59.0	3,780	1,737	3,578	885	16,518	10,350	8,829	2,282
Forest Residues	3,582	4.4	—	62	388	166	1,247	315	913	492
Manufacturing Residues	29,828	36.6	1,149	322	838	36	7,375	3,876	4,390	11,843
1984										
TOTAL PULPWOOD	86,410	100.0	5,115	2,339	5,021	1,128	26,882	15,517	14,625	15,783
Roundwood & Roundwood Chips	51,227	59.3	3,750	1,970	3,731	920	17,763	11,157	9,245	2,690
Forest Residues	3,698	4.3	—	76	413	169	1,342	331	918	451
Manufacturing Residues	31,486	36.4	1,366	293	877	40	7,776	4,029	4,463	12,642
1985										
TOTAL PULPWOOD	88,583	100.0	5,185	2,330	5,094	1,166	27,730	16,445	14,689	15,854
Roundwood & Roundwood Chips	52,852	59.7	3,791	1,972	3,737	947	18,543	11,848	9,238	2,777
Forest Residues	3,759	4.2	—	62	471	180	1,336	323	918	470
Manufacturing Residues	31,982	36.1	1,394	296	886	40	7,851	4,274	4,535	12,707
1986										
TOTAL PULPWOOD	91,442	100.0	5,213	2,343	5,899	1,170	28,509	16,679	15,117	16,412
Roundwood & Roundwood Chips	54,971	60.1	3,880	1,977	4,459	950	19,143	12,072	9,581	2,909
Forest Residues	3,803	4.2	—	67	530	180	1,309	324	918	475
Manufacturing Residues	32,668	35.7	1,433	299	911	40	8,057	4,282	4,619	13,028
1987										
TOTAL PULPWOOD	91,858	100.0	5,316	2,382	5,771	1,172	28,841	16,767	15,119	16,530
Roundwood & Roundwood Chips	55,332	60.2	3,883	1,986	4,305	953	19,467	12,157	9,580	3,002
Forest Residues	3,849	4.2	—	67	553	180	1,326	324	918	481
Manufacturing Residues	32,678	35.6	1,433	299	913	40	8,048	4,286	4,621	13,047

Totals not adjusted for rounding differences.

FIBER CONSUMPTION DEFINITIONS

1983—Actual consumption
1984—Best estimate based on year-to-date experience
1985-87—Consumption at capacity levels of production

recyclable paper consumed in paper & paperboard manufacture

actual consumption

Thousands Short Tons

END PRODUCTS	1983 Total	Mixed Papers	News-papers	Corru-gated	Pulp Substi-tutes	High Grade Deinking
TOTAL ALL GRADES	15,882	1,908	2,692	7,443	2,456	1,323
TOTAL PAPER	**4,247**	**97**	**1,199**	**250**	**1,521**	**1,180**
NEWSPRINT	1,082	—	1,036	—	46	—
PRINTING, WRITING & RELATED	1,020	6	—	8	727	279
PACKAGING & IND. CONVERTING	245	14	10	74	142	5
TISSUE	1,900	77	153	168	606	896
TOTAL PAPERBOARD	**10,449**	**1,373**	**1,258**	**6,855**	**835**	**129**
KRAFT, BLEACHED & UNBLEACHED	1,321	—	—	1,234	65	23
SEMICHEMICAL	1,360	7	4	1,346	3	—
RECYCLED	7,768	1,366	1,254	4,275	767	106
CONSTRUCTION PAPER & BOARD	**1,128**	**438**	**235**	**338**	**101**	**14**

Data on recyclable paper are collected in an industry-wide survey of paper and paperboard mills under the following definitions.
1983—Actual consumption
1984—Best estimate based on year-to-date experience
1985-1987—Consumption at capacity levels of production

planned future consumption

Thousands Short Tons

END PRODUCTS	1984 Total	Mixed Papers	News-papers	Corru-gated	Pulp Substi-tutes	High Grade Deinking	1985 Total	Mixed Papers	News-papers	Corru-gated	Pulp Substi-tutes	High Grade Deinking
TOTAL ALL GRADES	16,912	2,053	2,868	7,973	2,535	1,483	17,607	2,127	3,021	8,369	2,515	1,576
TOTAL PAPER	**4,602**	**105**	**1,319**	**284**	**1,577**	**1,316**	**4,771**	**130**	**1,414**	**319**	**1,526**	**1,381**
NEWSPRINT	1,194	—	1,136	—	58	—	1,273	—	1,213	—	60	—
PRINTING, WRITING & RELATED	1,107	6	—	10	739	352	1,051	6	—	11	650	384
PACKAGING & IND. CONVERTING	282	14	10	94	158	5	293	14	10	104	160	5
TISSUE	2,019	85	173	180	622	959	2,154	110	191	204	656	992
TOTAL PAPERBOARD	**11,186**	**1,510**	**1,304**	**7,371**	**853**	**148**	**11,699**	**1,562**	**1,349**	**7,730**	**882**	**176**
KRAFT, BLEACHED & UNBLEACHED	1,393	—	—	1,306	56	31	1500	—	—	1,391	60	50
SEMICHEMICAL	1,541	7	4	1,527	3	—	1,567	7	5	1,552	3	—
RECYCLED	8,252	1,503	1,300	4,538	794	117	8,632	1,555	1,344	4,787	819	126
CONSTRUCTION PAPER & BOARD	**1,124**	**438**	**246**	**317**	**105**	**18**	**1,135**	**433**	**258**	**319**	**106**	**19**

END PRODUCTS	1986 Total	Mixed Papers	News-papers	Corru-gated	Pulp Substi-tutes	High Grade Deinking	1987 Total	Mixed Papers	News-papers	Corru-gated	Pulp Substi-tutes	High Grade Deinking
TOTAL ALL GRADES	18,410	2,204	3,113	8,831	2,627	1,635	18,634	2,215	3,127	8,930	2,700	1,662
TOTAL PAPER	**4,938**	**134**	**1,435**	**336**	**1,600**	**1,435**	**5,063**	**134**	**1,437**	**357**	**1,676**	**1,459**
NEWSPRINT	1,267	—	1,222	—	65	—	1,299	—	1,222	—	77	—
PRINTING, WRITING & RELATED	1,055	6	—	11	654	385	1,073	6	—	11	673	383
PACKAGING & IND. CONVERTING	318	15	10	114	174	5	336	15	10	132	175	5
TISSUE	2,278	113	203	211	707	1,045	2,355	113	205	214	751	1,071
TOTAL PAPERBOARD	**12,282**	**1,615**	**1,409**	**8,159**	**920**	**180**	**12,360**	**1,626**	**1,419**	**8,237**	**917**	**181**
KRAFT, BLEACHED & UNBLEACHED	1,616	—	—	1,505	60	52	1,654	—	—	1,542	60	52
SEMICHEMICAL	1,596	7	5	1,581	3	—	1,614	7	5	1,599	3	—
RECYCLED	9,070	1,608	1,404	5,073	857	128	9,112	1,619	1,414	5,096	854	129
CONSTRUCTION PAPER & BOARD	**1,190**	**455**	**271**	**336**	**108**	**21**	**1,190**	**455**	**271**	**336**	**108**	**21**

Totals not adjusted for rounding differences.

Recyclable paper for molded pulp included under Construction Paper & Board as follows: 1983, 174,000 tons; 1984, 184,000 tons; 1985-87, 192,000 tons.

announced capacity expansion

NEW MILLS & MACHINES

Expansion projects include new paper, paperboard and wood pulp mills and new paper and paperboard machines in existing mills. These projects have been publicly announced by the managements of the companies concerned and are included in the capacity estimates reported in this survey. Estimates also include confirmed expansion projects that have not been publicly announced which, in keeping with the confidential nature of the survey, are not included in this listing.

PROJECTS INCLUDED IN SURVEY ESTIMATES

Thousands short tons

Grade	Annual Capacity	Proposed Start-up	Company & Location
Newsprint	225	1983	Augusta Newsprint Company Augusta, GA
Coated Groundwood	200	1987	Bowater Incorporated Catawba, SC
Coated Groundwood	180	1987	Consolidated Papers Incorporated Wisconsin Rapids, WI
Coated Free Sheet	200	1982-1983	Scott Paper Company Skowhegan, ME
Uncoated Free Sheet	150	1983	Champion International Corporation Courtland, AL
Uncoated Free Sheet	200	1987	Champion International Corporation Quinnesec, MI
Uncoated Free Sheet	160	1984	Crown Zellerbach Corporation Camas, WA
Uncoated Free Sheet	100	1985	Georgia Pacific Corporation Crossett, AR
Uncoated Free Sheet	230	1986	Georgia Pacific Corporation Port Hudson, LA
Uncoated Free Sheet	185	1987	Hammermill Paper Company Selma, AL
Uncoated Free Sheet	300-350	1985	International Paper Company Mobile, AL
Uncoated Free Sheet	215	1984	Union Camp Corporation Eastover, SC
Tissue	16	1984	Cascade Paper Incorporated Rockingham, NC
Tissue	56	1986	Crown Zellerbach Corporation S. Glens Falls, NY
Tissue	N.A.*	1984	Fort Howard Paper Company Green Bay, WI
Tissue	N.A.	1986	Fort Howard Paper Company Muskogee, OK
Tissue	70	1986	James River Corporation Naheola, AL
Tissue	14	1985	Tagsons Papers Incorporated Mechanicville, NY
Tissue	65	1982-1983	Wisconsin Tissue Mills Incorporated Menasha, WI
Unbleached Kraft Linerboard	315*	1985-86	Chesapeake Corporation West Point, VA
Solid Bleached Paperboard	250*	1986	Westvaco Corporation Covington, VA
Semichemical Paperboard	210	1982-1983	Macmillan Bloedel Incorporated Pine Hill, AL
Recycled Paperboard	175	1985	Temple-Inland Incorporated Ontario, CA
Wet Machine Board	3	1984	Lydall Incorporated Hoosick Falls, NY
Bleached Sulfate Pulp	265	1986	Champion International Corporation Quinnesec, MI
Bleached Sulfate Pulp	365	1984	Leaf River Forest Products Incorporated New Augusta, MS

*N.A.—Not available. * Will replace existing capacity.*

definitions and grade descriptions

Practical Maximum Capacity: Practical Maximum Capacity, as defined in this survey, is the tonnage of paper, paperboard or pulp of normal commercial quality that could be produced with full use of equipment and adequate supplies of raw materials and labor, and assuming full demand. No allowance is made for losses due to unscheduled shutdowns, strikes, temporary lack of power, etc., which cause decreases in actual production, but not in productive capacity. Capacity of paper machines which produce more than one grade is apportioned in accordance with actual production patterns or plans for future operation.

Capacity is reported in short tons of net finished paper and paperboard and air-dry (10% moisture content) pulp. Shrinkage of bleached or semi-bleached pulp is taken into account.

Annual practical maximum capacity—includes changes in capacity only for the portion of the year in which they are actually effective.

Year-end practical maximum capacity—assumes that all changes in capacity are in effect from the first day of the year in which they occur.

New Machines and Net Improvements: Capacity increases or decreases are shown in two main groups: New Machines and Net Improvements.

New Machines—are defined as machines purchased or to be purchased from equipment manufacturers. Consequently, capacity changes resulting from transfers of paper machines from one mill to another are shown under Net Improvements.

Net Improvements—are defined as net changes resulting from modernization of machines, dismantling old machines, shifts in grades, etc.

Capacity increases from new machines are shown under New Machines for the first two years of operation (including the year of installation). Any additional capacity realized in a third or subsequent year is shown under Net Improvements.

Market Pulp Capacity: Market pulp in this survey is defined as wood pulp produced in the U.S. for sale to pulp consumers. It excludes pulp for use or consumption by a producing mill or for shipment by a producing mill to other mills within its supply region which it owns, controls or with which it is affiliated. Shipments to owned mills outside the U.S. are defined as market pulp.

PAPER GRADES

Newsprint: Paper used chiefly in the printing of newspapers, made largely from mechanical pulp and weighing not less than 28½ pounds nor more than 35 pounds (24 × 36 – 500).

Uncoated Groundwood: Uncoated papers containing more than 10% groundwood or other mechanical pulps in their furnish, excluding newsprint.

Machine and Off Machine Coated: Bleached papers with a coating weight of at least 2½ pounds (25 × 38 – 500) on either side and at least 50% of the coating consisting of clay (Kaolin).

Coated Groundwood: Coated papers containing more than 10% mechanical pulp (mostly stone groundwood and/or refiner) in their furnish.

Coated Free Sheet: Coated papers containing 10% or less mechanical pulp (mostly stone groundwood and/or refiner in their furnish).

Uncoated Free Sheet: Bleached uncoated printing and writing papers containing not more than 10% groundwood or other mechanical pulps in their furnish; i.e., offset, tablet, envelope, business papers (bond, ledger, mimeo, duplicator) form bond, cover and text and related papers.

Bleached Bristols: Includes tabulating index, tag and file folder, coated cover bristols, and uncoated bristols (index, printing, and postcard).

Cotton Fiber: Papers containing 25% or more in their furnish of cotton, cotton rags, cotton waste, linters, linter pulp, flax, or similar fibers.

Thin Papers: Includes carbonizing, condenser, cigarette, bible, and similar papers.

Packaging and Industrial Converting: Wrapping paper, shipping sack, bag and sack other than shipping sack, and other converting papers—18 pounds and over.

Unbleached Kraft: Paper containing more than 80% unbleached sulfate wood pulp. Wrapping paper, shipping sack, grocers sack and other bag, and other converting papers—18 lbs. and over (24 × 36 – 500).

Bleached Packaging and Industrial Converting: Paper made for similar end uses as unbleached kraft, but made from bleached, and semibleached sulfate and unbleached sulfite pulps. Wrapping paper, shipping sack, grocers and other bag and sack, and other converting papers—18 lbs. and over (24 × 36 – 500).

Specialty Packaging: Paper and board of all weights and furnishes, usually used as protective packaging for food and other consumer products, such as bakery bags, fast food and frozen food wraps. Also includes glassine, greaseproof and vegetable parchment paper.

Special Industrial: Paper and board, of all weights, calipers and furnishes, designed for specialized end uses and manufactured to exact customer specifications; includes abrasive paper, electrical insulation, filter paper and similar grades. Does not include wet machine board.

Tissue: Includes sanitary grades: i.e., toilet, facial, napkin, toweling, sanitary napkin, wiper and special sanitary papers, and waxing, wrapping, wadding and miscellaneous grades.

PAPERBOARD GRADES

Unbleached Kraft Paperboard: Paperboard made from a furnish containing not less than 80% wood pulp produced by the kraft sulfate process.

Linerboard: Unbleached kraft paperboard manufactured for use as facing material when combining paperboard for conversion into corrugated or solid fiber boxes. Includes solid unbleached kraft linerboard, both Fourdrinier and Cylinder, mottled white linerboard and clay coated unbleached kraft linerboard.

Folding: Paperboard manufactured, such as clay coated unbleached kraft and bleached lined unbleached kraft backed, for conversion into folding cartons and beverage carriers.

Other: All unbleached kraft paperboard whose end use is not otherwise classified, such as board for a filler for solid fiber board to be fabricated into a shipping container, tube, can, drum, file folder, tag, automotive panel, etc.

Solid Bleached Packaging Paperboard: Paperboard made for use in packaging from a furnish containing not less than 80% virgin bleached wood pulp. Bleached bristols not manufactured for packaging are included in the proper bleached bristol classification under papers.

Linerboard: Solid bleached paperboard, either Fourdrinier or Cylinder, manufactured for use as facing material when combining paperboard for conversion into corrugated or solid fiber boxes.

Folding: Solid bleached paperboard for conversion into folding cartons, such as folding cartons for ice cream, butter, oleomargarine, frozen foods, bakery products, cosmetics, drugs, etc.

Milk Carton and Food Service: Solid bleached paperboard for conversion into milk carton, heavyweight cup, and round nested food container, plate, dish and tray, and for packaging for moist, liquid and oily foods.

Other: Solid bleached paperboard for conversion into packaging of blister pack, tubes and other products not classified above and for industrial products not classified under bleached bristols.

Semichemical Paperboard: Paperboard made from a furnish containing not less than 75% virgin wood pulp, the predominant portion of which is produced by a semichemical process.

Recycled Paperboard: Paperboard manufactured from a combination of recycled fibers from various grades of paper stock with the predominant portion of its furnish being recycled fibers: sometimes including a very minor portion of virgin fibers.

Linerboard: Recycled paperboard produced from a furnish containing less than 80% virgin kraft wood pulp and used as facing material when combining paperboard for conversion into corrugated or solid fiber boxes.

Corrugating Medium: Recycled paperboard produced from a furnish containing less than 75% virgin wood pulp and used as the fluting material when combining paperboard for conversion into corrugated boxes.

Container Chip and Filler Board: Recycled paperboard manufactured as a filler for solid fiber board for conversion into solid fiber boxes and other container chipboard (all chipboard under 26 pounds per 1000 sq. ft. manufactured for use as facing corrugated, solid fiber and single faced products which are used for interior packing, e.g., pads, partitions, dividers, layers and cushioning).

Folding: Recycled paperboard manufactured with bending quality for conversion into folding cartons (including unlined chipboard, kraft lined, white lined and clay coated).

Set-up: Recycled paperboard manufactured with non-bending specifications for conversion into rigid or set-up boxes (including plain chipboard, newslined, white vat lined).

Gypsum Wallboard Facing: Recycled paperboard manufactured for use as liner or facing on gypsum board, plasterboard (includes white, cream, gray, blue and all colors).

Other: Recycled paperboard with the same characteristics as paperboard for bending packaging or non-bending packaging but for non-packaging uses; plus recycled paperboard for end uses not otherwise classified, such as tag, file folder, tube, can, drum, match stem, tablet backs, toys, etc.

CONSTRUCTION PAPER & BOARD & OTHER

Construction Paper: Sheathing paper, felts (roofing felts, floor covering, automotive felts, deadening, industrial, pipe covering, refrigerator), asbestos paper and asbestos filled paper, flexible wood fiber insulation.

Wet Machine Board: Binders board, shoe board (e.g., counter board, heel board, innersole, etc.) automotive board, chair seat backing, coaster board, luggage, mill board, panel board, table top board, etc.

Insulating Board: A fibrous-felted homogenous panel made by interfelting of the fibers (e.g.,interior building board, wallboard, sound deadening board, acoustical tile, exterior sheathing board, roof insulation board, trailer board, etc.).

WOOD PULP

Dissolving & Special Alpha: Highly refined bleached white sulfite or sulfate pulp with a high content of alpha (pure cellulose) fiber.

Sulfite Paper Grades: Paper grade pulps produced by the sulfite process. Bleached pulp must achieve a G.E. Brightness of more than 75.

Sulfate & Soda Paper Grades: Paper grade pulps produced by the sulfate or soda process. Bleached pulp must achieve a G.E. Brightness of more than 75. Semibleached pulp must achieve a G.E. Brightness of not less than 45 or more than 75.

Semichemical: High yield pulps produced with the use of some chemical agent such as neutral sulfite (N.S.S.C.); alkaline cook; chemipulp (defibrated pulp put through reaction chambers); chemi-mechanical pulp with a yield usually above 60%.

Mechanical: Fine textured, usually bright pulps, used in paper and paperboard manufacture and produced by mechanical rather than chemical processes.

Stone Groundwood: Pulp produced by grinding wood logs or bolts (usually 4 ft. in length) into relatively short fibers.

Refiner: Pulp produced by subjecting wood chips and/or residues to atmospheric or open discharge refining.

Thermomechanical: A high-yield pulp produced by a thermomechanical process in which wood particles are softened by pre-heating under pressure prior to a pressurized primary refining stage. Usually replaces or reduces the chemical pulp component in newsprint or groundwood papers.

WOOD PULP FOR CONSTRUCTION PAPER & PAPERBOARD

Coarse, often brown, pulps used in the manufacture of insulating board and construction paper. Also includes similar pulps if used in the manufacture of wet machine board. Excludes pulp for hard pressed board.

Stone Groundwood and Refiner: Pulps produced by the stone groundwood or refiner processes but used in the manufacture of construction paper and board.

Defibrated/Exploded: Pulps produced by subjecting wood chips to preheating and pressurized refining. Similar to the thermomechanical process except that operating variables produce an economical, coarse brown pulp suitable only for construction paper and board.

Screenings: Rejects and off-quality screenings from all grades of wood pulp except dissolving.

FIBERS

Roundwood: Comprises roundwood bolts and logs (4 feet or longer, including tree lengths) brought to the pulpmill for chipping, or chips made from primary roundwood bolts and logs at a chipmill, remote from the pulpmill.

Forest Residues: All logging residues such as portions of bolts or logs less than the minimum diameter specified by the consuming mill and poles, saplings, slash, limbs, twigs, or portions of bolts or logs not regarded as merchantable in normal pulpwood or sawlog operations. May also include merchantable portions of trees that will not be used for higher value products. Chips made from forest residues.

Manufacturing Residues: All mill residues such as slabs, edgings, trimmings, cores, planer shavings, sawdust or other wood residues of a wood manufacturing process and chips made from these residues.

Other Fibers: Cotton linters, cotton linter pulp, textile mill waste and cuttings, rags, waste rope and cordage, bagasse, flax, straw, jute, esparto, kenaf and all other vegetable fibers used in paper and paperboard manufacture.

RECYCLABLE PAPER

Mixed Papers: Number 1 and 2 mixed papers, super mixed papers, boxboard cuttings, mill wrappers.

Newspapers: Number 1 news, overissue news, super news. Any grade to be used as a news substitute.

Corrugated: Old containers both corrugated and solid fiber, container plant cuttings.

Pulp Substitutes & High Grade Deinking: Includes ledger, tabulating cards, bleached sulfate shavings (unless used as a news substitute). Envelope and bleached sulfite and sulfate cuttings, coated book stock, news and publication blanks, kraft paper and bags and all other grades not classified above.

Print free grades are reported as *Pulp Substitutes* and printed grades, if deinked, are reported as *High Grade Deinking*.

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CORRIGENDUM

	CHEMICAL PAPER GRADES of which: market	
	1983	1986*
WORLD TOTAL	27,547	29,012
DEVELOPED MARKET ECONOMIES	22,188	23,289
NORTH AMERICA	12,358	13,208
U.S.	5,336	6,037
CANADA	7,022	7,171
JAPAN	983	983
WESTERN EUROPE	8,511	8,568
E.E.C.	1,061	1,126
NORDIC COUNTRIES	5,645	5,660
REST OF WESTERN EUROPE	1,805	1,782
OCEANIA	296	345
OTHERS	40	185
DEVELOPING MARKET ECONOMIES	2,761	3,125
AFRICA	496	497
LATIN AMERICA	2,094	2,378
of which: BRAZIL	1,467	1,608
MEXICO	--	--
ASIA	171	250
CENTRALLY PLANNED ECONOMIES	2,598	2,598
of which: U.S.S.R.	2,000	2,000

*No data available for 1987.